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LAW OFFICES OF JONATHAN ALAN QUINE

Tracia Procks

Attorney Docket No. 02-031910US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Juha Punnonen, et al.

Application No.: 09/886,942

Filed: June 21, 2001

For: NOVEL CHIMERIC PROMOTERS

Examiner: Unassigned

Art Unit: 1645

LETTER TO OFFICIAL DRAFTSPERSON

Attn: Box Missing Parts

Assistant Commissioner for Patents

Washington, D.C. 20231

Sir:

Applicant hereby submits 23 sheets of formal drawings to be made of record in the above-identified case.

Respectfully submitted,

Emily M. Haliday, J.D., PhyD

Reg. No. 38,903

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Figure 1: Screening libraries of chimeric promoter sequences

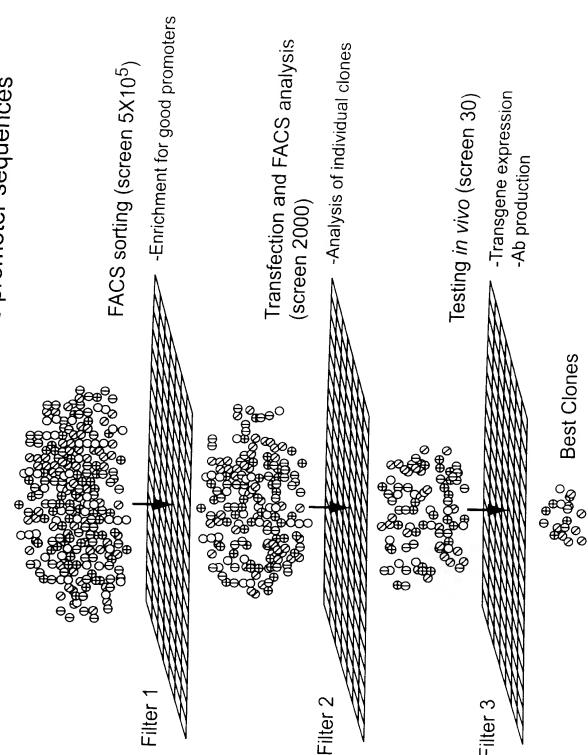
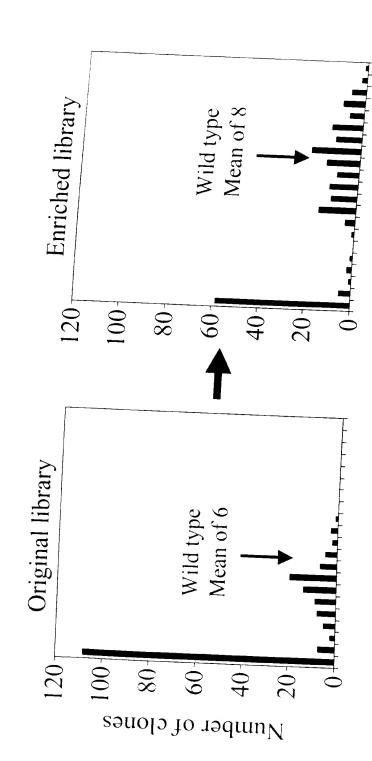


Figure 2: Enrichment of chimeric promoter libraries by FACS sorting



Reporter gene expression

15E1 Figure 3: Diverse activities of chimeric promoter 6H71 01**H**6 9E6 sequences in transfected cells 11E5 691**Q**V JuwoT 1196 10B5 1<u>H</u>6 Rhesus 196 19719t96 8D6 9C15 Vector Reporter Gene Expression (+/- SD)

Figure 4: Luciferase expression in muscle 7 days after plasmid injection

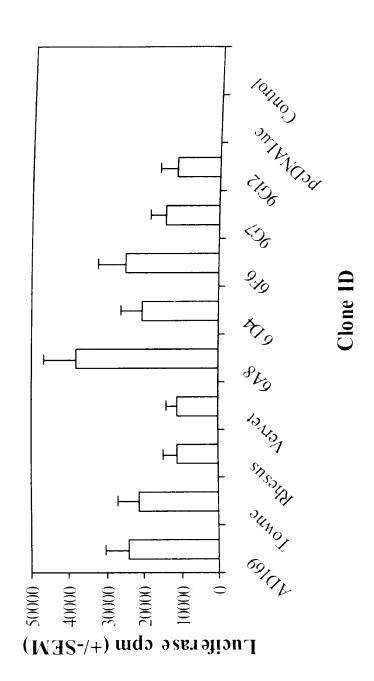
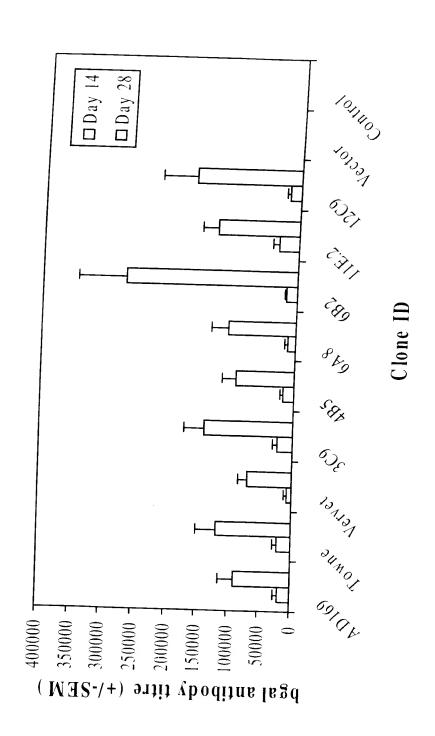


Figure 5: Comparison of Luciferase expression from clone 6A8 6A8 and parental clones Towne Clone ID AD169 Vector 35000 30000 25000 20000 15000 10000 5000 Luciferase cpm (+/- SEM)

Figure 6A: Antibody responses following injection with β galactosidase-encoding plasmid



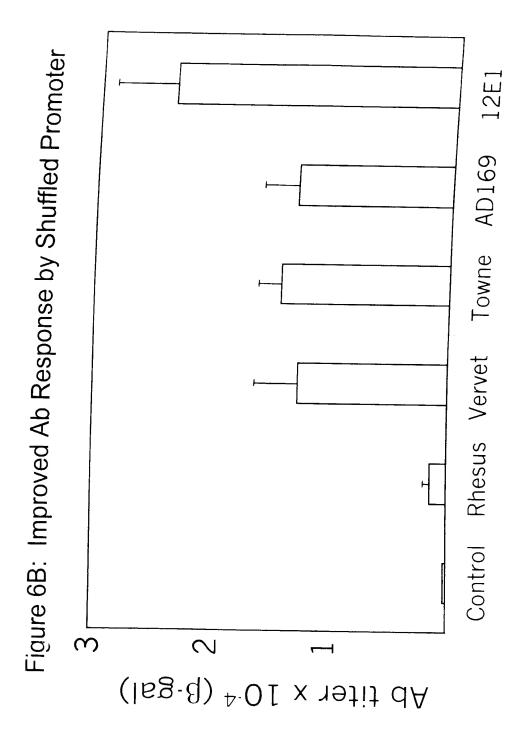


Figure 7: Chimeric promoter 6A8 is functional in human muscle tissue

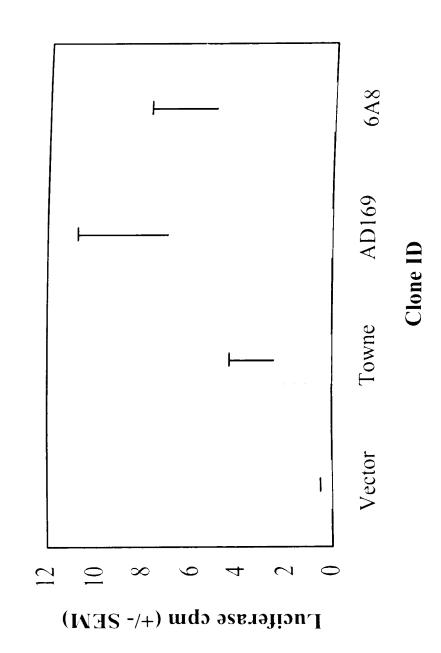


Figure 8A: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

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ATATUAGGCTATATCGCCGATAGAGGCGACATCAAGCTGGCACATGGCCAATGCATATCGATCTATACATTAAATCAATATTGGCAATTAGCCATATTTG
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Figure 8B: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences
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Figure 8C: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

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GACCTCAATGGGTGGAGTATTTACGGTAAACTGGCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGTA
                                                                                    GACGTCAATGGGTGGGGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGTTA
                                     GACGTCAATGGGTGGAGTATTTACGGTAAACTGCTCACTTGGCAGTACATCATGTATCATATGCCAAGTACG-CCCCTATTGACGTCAATGACGGTA
                                                                                                                         GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATGTCATATGCCAAGTCCG-CCCCTATTGACGTCAATGACGTTA
                                                                                                                                                                     GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAGGTGTATCATATGCCAAGTACG-CCCCCTATTGACGTCAATGACGTA
                                                                                                                                                                                                              GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCGCCCCCTATTGACGTCAATGACGTA
                                                                                                                                                                                                                                                                                               GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCTATTGACGTCAATGACGTA
                                                                                                                                                                                                                                                      GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTACG-CCCCCTATTGACGTCAATGACGGTA
                                                                                                                                                                                                                                                                                                                                       GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGGCGTA
                                                                                                                                                                                                                                                                                                                                                                                GACGTCGATGGGTGGAGTATTTACGGTAAACTGCCCCACTTGGCAGTACATCAAGTGTATCATATGATGTCGCCAGTCCG-CCCCTATTGACGTCAATGACGGTA
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Figure 8D: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

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AATCAACGGGACTTTCCAAAATGTCGTAACACTCCGCCCCATTGACGAAATGGGCGGTAGGCGTGTACGGTGG AGGTCTATATAAGCAGAGTTT
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Figure 8E: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

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TAGTGAACCGTCAGATCGCCTGGAGACGCCATCCACGCTGTTTTGACCTCCAT-AGAAGACACCGGGACCGATCCAGCCTCCGCGGCGGGAACGGTTGCA
                         TAGGGAACCGCCATTCTGCCTGGGGACGC-----CGGAG----GAGCTCCATTGGAAGAGCCGGGACCGATCCAGCCTCCGCGGCCGGGACGGTGCA
                                                   TAGGGAACCGCCATTCTGCCTGGGGACGC-----CGGAG----GAGCACCAT-AGAAGACACCGGGACCGATCCAGCCTCCATAGCCGGGACGGTGCA
                                                                            TAGTGAACCGTCAGATCGCCTGGAGACGCCATCCACGCTGTTTTGACCTCCAT-AGAAGACACCGGGACCGATCCAGCCTCCGCGGCGCCGGGGAACGGTGCA
                                                                                                       TAGTGAACCGTCAGATCGCCTGGAGACGCCATCCACGCTGTTTTGACCTCCAT-AGAAGACACCGGGACCGATCCAGCCTCCGCGGCCGGGACGGTGCA
                                                                                                                                                                                                               TAGTGAACCGTCAGATCGCCTGGAGACGCCATCCACGCTGTTTTGACCTCCAT-AGAAGACACCGGGACCGATCCAGCTCCGGCGCGGGCGGGTGCA
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                                                                                                                                                                                                                                                                                                                       TAGTGAACCGTCAGATCGCCTGGAGACGCCATCCACGCTGTTTTGACCTCCAT-AGAAGACACCGGGACCGATCCAGCCTCCGCGGCCCGGGGACGGTGCA
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Figure 8F: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences CTTGGGGTCTATACACCCCCGCTTCCTTATGCTATAGTGATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTTATTGG CTTGGGGGCCTATACACCCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGCCTATACACCCCCCCCTTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGCGTGGGTTATTGACCATTATTGACCACTCCCTATTGG CTTGGGGGCCTATACACCCCCCCCCTTTCCTTATGCTATAGTGATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGGCCTATACACCCCCCCCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGGCCTATACACCCCCCCCTTCCTTATGCTATAGGTGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGCCTATACACCCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGCCTATACACCCCCCCCCTTTCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGCCTATACACCCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGCCTATACACCCCCCCCCTTCTTATAGGTGATGGTATAGCTTAGCCTTAGGTGTGGGTTATTGACCATTATTGACCATTATTGACCATTGTTGCCCTATTGGC CTTGGGGCCTATACACCCCCCCCCTTCCTTATGCTATAGGTGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG CTTGGGGTCTATACACCCCCCCCTTCCTCATGTTATAGGTGTATAGCTTAGCCTTAGGTGTGGGTTATTGACCATTATTGACCACTTCTCCCTTATTGG TOAGGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTATTGGCTATATGCCAATACTCTGTCTTCAGAGACTGACACGGAC CTTGGGGCCTATACACCCCCCCCCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCATCCCCCTATTGG CTTGGGGTCTATACACCCCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGCCTATACACCCCCCCCTTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGGCCTATACACCCCCCCCTTTCCTTATGCTATAGGTGTATAGCTTAGCCTATAGGTGTGGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGCCTATACACCCCCCCCCCTCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCCTATTGG CTTGGGGCCTATACACCCCCCCCTTTCCTTATGCTATAGGTATAGCTTAGCCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCCTTATTGG TGACGATACTTTCCATTACTAATCCATAACAGGGCTCTTTGCCACAACTATCTCTATTGGCTATATGCCAATACTCTGTCTTCAGAGACTTCAGAGACTGACACGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTTTGGCTATATGCCAATACTCTGTCTTTTTGAGAGACTTACTGAGAGACTTCAGAGACTTAATGCCAATACTTCTGTCCTTCAGAGACTAACAAGAAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTTTTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC TGACGATACTTTTCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTCTATTGGCTATATGCCAATACACTGTCCTTCAGAGACTGACACGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTTTGGCTATAGCCAATACTCTGTCTTCAGAGACTGACACGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACAGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTATTGGCTATAGCCAATACTCTGTCCTTTCAGAGACTTCAGAGACTGACAGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACAGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTCTATTGGCTATATGCCAATACTCTGTCTTTCAGAGACTGACACGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTATTGGCTATATGCCAATACTCTGTCTTCAGAGACTGACACGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTTGCCACACTCTCTTTATTGGCTATATGCCAATACACTGTCCTTCAGAGACTGACACGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACAGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTATTGGCTATATGCCAATACTCTGTCTTTCAGAGACTGACAGGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTATTGGCTATATGCCAATACACTGTCCTTCAGAGACTGACGGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTATTGGCTATATGCCAATACTCTGTCTTTCAGAGACTGACACGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTATTGGCTATATGCCAATACTCTGTCCTTTCAGAGACTGACACGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCTCTATTGGCTATATGCCAATACACTGTCTTCAGAGGCTGACACGGAC TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAGCTATCTCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGAAC from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences. (947) (866) (666) (946) 998) (386) 1098) (866) (946)(802) (866) (1001) 1098) 1046) 1046) 1098) 1098) (1097)(1101) 946) 988) (966) (866) (866) (886) (866)1089) 1047) 1099) 1098) 1046) 1088) (808) 1096) 1098) 1098) 1098) 1088) (868) 12E1 12H9 968 12E1 12C9 4B5 6F69F11 9612 967 1209 12H9 6A8 6B2 6F6 9612 968 9E1 9611 5134 AD169 Towne 309 6D4 967 Susansar 964 AD169 Towne usensus 9E1

Figure 8G: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

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TCTGTATTTTTACAGGATGGGGTCTCATTTATTATTACAAATTCACATATACAACGCGGCGGTCCCCCGTGCCGGCGGCAGTTTTTATTAAACATAGCGTGG
TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTACAAATTCACATATACAACACCACCGTCCCCAGGTGCCCGCAGTTTTTGTTAAACATAGCGTGG
                                                            TCTGTATTTTACAGGATGGGGTCCCATTTATTATTACAAATTCACATATACAACCCACCGTCCCCAGTGCCCGCAGTTTTTATTAAACATAGCGTGG
                                                                                                                            TCTGTATTTTACAGGATGGGGTCCCATTTATTATTACAAATTCACATATACAACGACGTCCCCGTGCCCGTGCTCGCAGTTTTTATTAAACATAGCGTGG
                                                                                   TCTGTATTTTACAGGATGGGGTCTCATTTATTACAAATTCACATATACAACACGCGTCCCCCGTGCCGGAGTTTTTATTAAACATAGGGTGG
                                                                                                                                                                      TCTGTATTTTACAGGATGGGGTCCCATTTATTTACAAATTCACATATACAACACGCCGTCCCCCGTGCCCGGAGTTTTTATTAAACATAACGTGG
                                                                                                                                                                                          TCTGTATTTTTACAGGATGGGGTCCCATTTATTACAAATTCACATATACAACACGCCGTCCCCGGTGCCCGGAGTTTTTATTAAACATAGGGTG
                                                                                                                                                                                                                TCTGTATTTTACAGGATGGGGTCTCATTTATTACAAATTCACATATACAACGCCGTCCCCCGTGCCCGTGCCCGATGTTTTATAAACATAGCGTGC
                                                                                                                                                                                                                                                                                                  TCTGTATTTTTACAGGATGGGGTCTCATTTATTTACAAATTCACATATACAACACGCGGTCCCCCGTGCCGCGCGCAGTTTTTATTAAACATAGCGTGG
                                                                                                                                                TCTGTATTTTACAGGATGGGGTCCCATTTATTACAAATTCACATATACAACACGCCGTCCCCCGTGCCCGCAGTTTTTATTAAACATATAAACGTGG
                                                                                                                                                                                                                                    TCTGTATTTTACAGGATGGGGTCCCATTTATTATTACAAATTCACATATACAACACACGGCGGTCCCCGTGCCCGGGGGTTTTTATTAAACATAGGGTGG
                                                                                                                                                                                                                                                        TCTGTATTTTACAGGATGGGGTCCCATTTATTACAAATTCACATATACAACAACGCCGTCCCCGTGCCCGGAGTTTTTATAAACATAGGGTGG
                                                                                                                                                                                                                                                                            TCTGTATTTTTACAGGATGGGGTCCCATTTATTTACAAATTCACATATACAACGCCGTCCCCAGTGCCGCGGTTTTTATAAACATTAAACATAGCGTGG
                                                                                                                                                                                                                                                                                                                        TCTGTATTTTTACAGGATGGGGTCTCATTTATTATTTACAAATTCACATATACAACGCGGTCCCCCGTGCCGGCGCGTTTTTATTAAACATAGCGTGG
                                                                                                                                                                                                                                                                                                                                            TOTOTATITITACAGGATGGGGTCCCATTTATTATTACAAATTCACATATACAACGCCGTCCCCCGTGCCCGCGCGCAGTCTTTATTAAACATAGCGTGG
                                                                                                                                                                                                                                                                                                                                                                TCTGTATTTTACAGGATGGGGTCCCATTTATTATTACAAATTCACATATACAACGCGGTCCCCAGTGCCGGCAGTTTTTATTAAACATAGCGTGG
                                                                                                                                                                                                                                                                                                                                                                                      TCTGTATTTTACAGGATGGGGTCTCATTTATTTACAAATTCACATGTACAACACCACCGTCCCCAGTGCCCGCAGTTTTTATTAAACATAACGTCGCG
                                                                                                                                                                                                                                                                                                                                                                                                                                TCTGTATTTTTACAGGATGGGGTCCCATTTATTTACAAATTCACATATACAACACGCCGTCCCCGTGCCCGTGCCGGAGTTTTTATTAAACATAGCGTGG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        HATCTCCACGCAAATCTCGGGTACGTGTTCCGGACATGGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCTGGTCCCATGCCTCCAGG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              GATCTCCACGCGAATCTCGGGTACGTGATCCGGACATGGGCTCTTCTCCGGTAGCGGTGGAGCTTCCACATCCGAGCCCTGGTCCCATGCCTCCAGCGG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GATCTCCACGCAATCTCGGGTACGTGTTCCGGACATGGGCTCTTCTCCGGTAGGGCGGGGCGGAGCTTCCACATCCGAGCCTTGGTCCCATGCCTCCAAGCGC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GATCTCCACGCGAATCTCGGGTACGTGCTTCCGGACATGGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCTTGCTCCCATGCTCCCAGCGGC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCTGGTCCCATGCCTTCAGCGGC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GATCTCCACGCGAATCTCGGGGTACGTGTTCCGGACATGGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACACTCCGAGCCCTGGTCCCATGCCACCGTGGTCCCAGCGGC
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Figure 8H: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences TCATGGTCGCTCGGCAGCTCCTTGCTCCTAACAGTGGAGGCCAGACTTAGGCACAGGATGCCCACCACCACCACGTGTGCCGCACAAGGCCGTGGCGG TCATGGTCGCTCGGCAGCTCCTTGCTCCCAACAGTGGAGGCCAGACTTAGGCACAGGATGCCCACCACCACCAGTGTGCCGCACAAGGCCGTGGCGG TCATGGTCGCTCGGCAGCTCCTTGCTCCTAACAGTGGAGGCCAGACTTAGGCACACAGACAATGCCCACCACCACCACCAGTGTGCCGCACAAGGCCGTTGGCGG TCATGGTCGCTCGGCAGCCCCTTGCTCCTAACAGTGGAGGCCAGACTTAGGCACAAATGCCCACCACCACCACCACGTGTGCGCGCACAAGGCCGTGGCGG TCATGGTCGCTCGGCAGCTCCTTACTCCTAACAGTGGAGGCCAGACTTAGGCGCAGCACAATGCCCACCACCACCAGTGTGCCGCACAAGGCCGTGGCGG TCATGGTCGCTCGGCAGCTCCTTGCTCCTAACAGTGGAGGCCAGACTTAGGCGCACAATGCCCACCACCACCACGTGTGCCGCACAAGGCCGTGGCGG TCATGGTCGCTCCGGCAGCTCCTTGCTCCTAACAGTGGAGGCCAGACTTAGGCACAGACACAATGCCCACCACCACCACAGGTGTGCCGCACAAAGGCCCTTGGCCG TCATGGTCGCTCGGCAGCTCCTTGCTCCTAACAGTGGAGGCCAGACTTATGCACAGACACAATGCCCACCACCACCACAGTGTGCCGCACAAAGGCCGTGGCGG TCATGGTCGCTCGGCAGCTCCTTGCTCCTAACAGTGGAGGCCAGACTTATGCACAGACACAATGCCCACCACCACCAGCAGCCGTGGCGCAGCGGTGGCGC TCATGGTCGCTCGGCAGCTCCTCGCTCCTAACAGTGGAGGCCAGACTTAGGCACAGCACAATGCCCACCACCACCAGTGTGCCGCACAAAGGCCGTGGCG TCATGGTCGCTCGGCAGCTCCTTGCTCCCAACAGTGGAGGCCAGACTTAGGCACAGCACAAATGCCCACCACCACCACAGTGTGCCGCACAAAGGCCGTGACGG TCATGGTCGCTCGGCAGCTCCTTGCTCCTAACAGTGGAGCCAGACTTAGGCACAGCACAACAACACCACCACCAGTGTGCCGCACAAAGGCCGTTGGCGC TAGGGTATGTGTCTGAAAATGAGCTCGGAGATTGGGCTCGCACCGCTGACGCAGATGGAAGGACTTAAAGGCAGCGGCAGAAGAAGAAGATGCAGGCTGAGT TAGGGTATGTGTCTGAAAATGAGCTCGG--AGTGGGCTTGCACGCTGACGCATTTGGAAGACTTAAGGCAGCGGCAGAAGAAGAAGAAGAAGACGCGGCAGCTGAGG TAGGGTATGTGTCTGAAAATGAGCTCGGAGATTGGGCTCGCACCGCTGACGCAGATGGAAGGACTTAAGGCAGCGGCAGAAGAAGAAGAAGAAGACAGCTGAGT TAGGGTATGTGTCTCGAAAATGAGCTCGGAGATTGGGCTCGCACCGCTGACGCAGATGGAAGGCTTAAGGCAGCGGCAGAAGAAGAAGAAGAAGGCAGCAGCTGAGT TCATTGTTGCTCGGCAGCTCCTTGCTCCTAACAGTGGAGGCCAGACTTAGGCACAGCACAATGCCCACCACCACCAGTGTGCCGCACAAAGGCCGTWWGCG rom AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences. 1501 (1401) 1446) 1346) 1396) 1446) 1347) 1398) 1398) 1397) 1498) (1498)1398) 1399) 1398) 1346) 1346) 1388) 1205) 1398) 1498) 1388) 1398) (868) 1447) 1498) 1499) 1498) 1446) 1488) 1305) 1496) 6F6 12H9 4B5 6D4 6F6 12E1 4B5 6A8 6B2 6D4 968 1209 12E1 6A8 9E1 9612 Towne 309 6B2 9E1 904 AD169 nsensus

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9G12

TAGGGTATGTGTCTGAAAATGAGCTCGGAGATTGGGCTCGCACCGCTGACGCAGATGGAAGACTTAAGGCAGGGGCAGAAGAAGAAGAAGAAGAAGGCAGCAGCTGAGT

Figure 81: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

1601	TGTTGFATTCTGATAAGAGTAAAAAGTAAAA	TGTTGTATTCTGATAAGGTCAGAGGTAATCCCGTTAACCCCGTTGGAGGGGGGGG		TGTTGTAITCTGATAAGAGTCAGAGGTAACTCCCGTTGCGTGACCTCCTCTCTCT	TGTTGTATTCTGATAAGAGTCAGAGGTAACTCCCCGTTGCCCCTCCCCTCCTCCTCTCTCT	TGTTGTGTTCTGATAAGAGTCAGAGGTAACTCCCGTTGCCGTGCTGCTGTTAACGTGGAGGGCAGTGTAGTCTGAGCAGTACTCGTTGCTCGCGCGCCCCC	TGTTGTATTCTGATAAGAGTCAGAGGTAAACAGTAAACAGAAAAAAAA	TGTTGTGTTCTGATAAGAGTCAGAGGTAACTCTCTTTGTTGTTTAACGGTGGAGGGCAGTGTAGTCTGAGCAGTGTAGTCTGAGCAGTACTCGTTGTTGTTGCTCGGT	TGTTGTGTTCTGATAAGAGTCAGAGGTAACTCCCGTTGCCGTGCTGTTGTGTGTG	TGTTGTATTCTGATAAGAGTCAGGGGTAACTCCCCGTTGTTGTTAAAGAGGGCAGTGTAGGTGTAGTCTGAGCAGTGTACTCGTTGCTGCTCGTGCCCCC	TGTTGTATTCTGATAAGAGTCAGAGGTAACTCCGTTTGCAGATCATACTGGAGGGAG	TGTTGTATTCTGATAAGAGTCAGAGGTAACTCCCGTTTGCAGTAACTTCCGATTAACAGTAAAAAAAA	TGTTGTATAAAAAGTCAGAAGTAACTCCCGTTGCGGTGTTATAAAAAAAA	TGTTGTATACTGATAAGAGTACCCGTTTCCGGTTTCCGTTTCCGTTTCCGTTTCCGCTTCTCTGAGCAGTACTTCTGAGCAGTACTTCCTCCCCCCCC	TGTTGTATTCTGATAAGAGTCAGGGTAACTCCCGTTGCGGTGATAAAAAGGTGAGGCAGTGTGAAGTCTGAGCAGTACTCGTTGCTGCGCGCCC	TGTTGTATTCTGATAAGAGTCAGAGGTAACTCCCGTTGCGGTGCTTCTTTAACACTACAAATGTAGCAATTGTAAGAGTAACTCGTTGCTGCCCGCAAAAAAAA	TGTTGTATTCTGATAAGAGTCAGAGGTAACTCCCGTTGCGGTGTGTTTAAACACAAAAAAAA	TGTTGTATAGAGACAGAGAAACTCCCGTTGCGGTGCTGTTAGAAAACTCCCGTTAGAAAAAAAA	TGTT.U.FGTTCTGATAAGAGTCAGAGGTAACTCCCGTTGCGGTGCTTTAACGTCATACAACAAGTGTAGCTGCTTGCT	TGTTGTATTCTGATAAGAGTCAGAGGTAACTCCCGTTGCGGTGCTTTAACCCCTTGATAACTGCTGCAGAAGTACTGGTGCTGCCAACAACTACTGGTGCTTGCT	TGTTGTATTCTGATAAGAGTCAGAGGTAACTCCCGTTGCGGTGCTGTTAACGGGTGGAGAGAGA	1701	ACCAGACATAATAGCTGACAGACTAACAGACTGTTCCATGGGTCTTTTTTTT	ACCAGACATAATAGCTGACAGACTAACAGACTGTTCCATGGGTCTTTTTTTT	I.I.)))(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(ACCAGACATAATAGCTGACAGACTAACAGACTGTTCCTTTCCATGGGTCTTTTCTGCAGTCACGTCACTTTT	ACCAGACATAATAGCTGACAGACTAACAGACTGTTTCCTTTTCCATGGGTCTTTTTCTGCAGTCAACACAAAAA	ACCAGACATAATAGCTGACAGACTAACAGACTGTTCCTTTCCATGGGTCTTTTCTGCAGTCACTCATTT	ACCAGACATAATAGCTGACAGACTAACAGACTGTTTCCATGGGTCTTTTCTACAGACTATATCTAGAGAGAG	ACCAGACATAATAGCTGACAGACTGTTCCTTTCCATGGGTCTTTTCTGCAGTCACTCTTT	ACCA/ACATAATAGCTGACAGACTAACAGACTGTTCCTTTCCATGGGTCTTTTCTGCAGACTCACACACA	ACCAGACATAATAGCTGACAGACTAACAGGCTGTTTCATGGGTCTTTTCATGCAGTCAACAGAGTGAACAGAGTGAAAAAAAA	ACCAAACATAATAGCTGACAGACTAACAGACTGTTCCTTTCCATGGGTCTTTTCTGCGGTCACCCCCCCC	ACCAGACATAATAGCTGACAGACTAACAGACTGTTCCTTTCCATGGGTCTTTTCTGCAGTCACACACA	ACCAGACATAATAGCTGACAGACTAACAGACTGTTTCCTTTTCGATGGGTCTTTTTTTT	ACCAGACATAATAGCTGACAGACTGTTCCTTTCCATGGGTCTTTTCTACAGTCACTCTTTTCTGCAGTCACTCTTTTCTACAGTCACTCTTTTCTACAGTCAGT	ACCAGACATAATAGCTGACAGACTGTTCCTTTCCATGGGTCTTTTCTGTACCTCC11	ACCAGACATAATAGCTGACAGACTACTGTTCCTTTCCATGGGTCTTTTTCATAGAGTAAAAAAAA	ACCAGACATAATAGCTGACAGACTACTGTTCCTTTCCATGGGTCTTTTTCTGCAGACTACCCTTT	ACCAGACATAATAGCTGACAGACTAACAGGCTGTTTCCTTTTCATGGGTCTTTTTCTGCAGTCACCGCCC11	ACCAGACATAATAGCTGACAGACTAACAGACTGTTCCTTTCCATGGGTCTTTTCTGCACACACCACCACA	ACCAGACATAATAGCTGACAGACTGTTCCTTTCCATGGGTCTTTTCTGAGACTCACCACCACA	ACCAGACATAATAGCTGACAGACTAACAGACTGTTCCTTTTCCATGGGTCTTTTCTGCAGTCCACCGTCCTT
	(1598	(1589)	(858)	(1547)	(1598)	(1597)	(1546)	(1598)	(1546)	(1546)	(1588)	(1405)	(1596)	(1598)	(1598)	(1598)	(1588)	(1598)	(1598)	(1596)	(1601)		(1698)	(1689)	(868)	(1647)	(1698)	(1697)	(1646)	(1698)	(1646)	(1646)	(1688)	(1505)	(1696)	(1698)	(1698)	(1698)	(1688)	(1698)	(1698)	(1696)	(1701)
	10B2	11E2	1209	12E1	12H9	309	485	6A8	6B2	6D4	6F6	9E1	9F11	9611	9612	9G4	967	9G8	AD169	Towne	onsensas		1082	1182	1209	12E1	12H9	30.9	4B5	6A8	6B2	6D4	6F6	9E1	9F11	9611	9612	9G4	2D6	9C8	AD169	Towne	msensus

Vector for premoter evolution

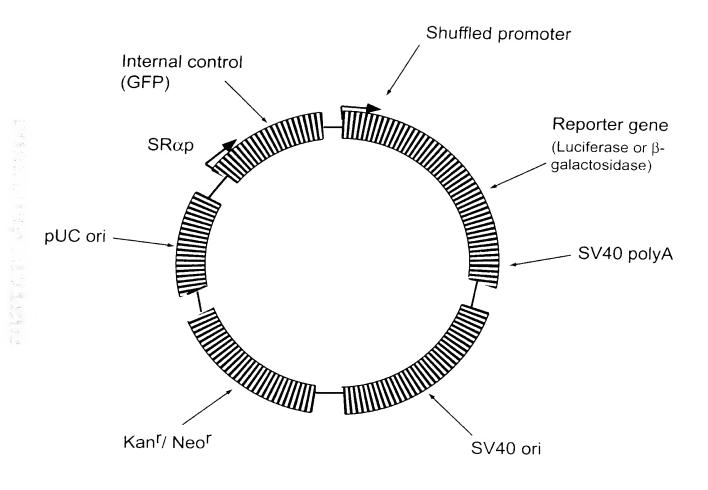


Fig. 9

Figure 10A

	19/23	
1 ATATGAGGCTATATCGCCGATAGAGGCGACATCAAGCTGGCACATGGCCAATGCAT ACTTGGCACGGTGCCAA.GTTTGGGGCGGGGTCTTGGCACCGTGCCAA ATTGAATTGGCATGGTGCCAATAATGGCGGCCATATTGGCTATATGCCA	ATCGATCTATACATTGAATCAATATTGGCAATTAGCCATATTAGTCATTGGTTTATATGGCGTCCGCCATATTGGTTTTGGCATATGTCCAATATTATTGATCCATATAGCGTCCGCCATATTGGTTTTGGCATATAGGCAATATTATTGATCCATATTAGCATAGCCAATATTGGCTATTGGCCATTGCATACGTTGTATCTATATTGTACAT ATAAATCAATATTGGCTATTGGCCATTGCATACGTTGTATTCATAATATGTACAT CCAATATCCAATATGGCTATTGGCCAGGTTCAATAGAATGGCCAATAAGC CCTATGCCAATATGGCTATTGGCCAGGTTCAATACTATTTGCCTT	181 TTATATTGGCTCATGTCCAATATGACCGCCATGTTGACATTGATTATTCACTAGTTAT CAATATGCCATTGGCCAACATGGCAA.TGGGCCAGTATTGATTATAGCCAATATAT ATGCCATATAGTATTCCATATATGGGTTTTCCTATTGACGTAGATAGCCCCTCCCAAT
Towne_promoter_fr_PCR_prod_seq Rhesus_monkey_PCR_prod_821bp Vervet_(Simian)_PCR_product_seq	Towne_promoter_fr_PCR_prod_seq_Rhesus_monkey_PCR_prod_821bp_Vervet_(Simian)_PCR_product_seq_Towne_promoter_fr_PCR_prod_seq_Rhesus_monkey_PCR_prod_821bp_Vervet_(Simian)_PCR_product_seq_Revet_(Simian)_PCR_product_seq_	Towne_promoter_fr_PCR_prod_seq Rhesus_monkey_PCR_prod_821bp Vervet_(Simian)_PCR_product_seq

Figure 10B

		20)/23	
Figure 10B	300 TAATAGTAATCAATTACGGGGTCATTAGTTCATAGCCCCATATATGGAGTTCCGC AGGCAATAATCCATATTGGCATATGTCCATATTGCCTATAGCCCATATTGGC GGGCGGTCCCATATACCATATTGGGGCTTCCTAATACCGCCCATAGCCCCC	301 GTTACATAACTTACGGTAAATGGCCCGCCTCGTGACCGCCCCAACGACCCCCCGCCC TTATGTCCATTACCAATATATGGGTCTTCCTATATACGTCATAGGTACCGCCC ATTGACGTCAATGGTCTCTATATGGTCTTTCCTATTGACGTCATAGGTACCGCCC	361 .ATTGACGTCAA .ATTGACGTAATATGGGTACCTCCATTGACGTCAATGGGAGGGA	421 TAATGACGTATGTTCCCATAGTAACGCCCAATAGGGACTTTCCA TAATACCGCCCATTGACGTGTATAGGACCGTCCCATTGACGTCAATAGGCCCACCTCCCA TCAATGCCCATTGACGT
	Towne_promoter_[r_PCR_prod_seq_Rhesus_monkey_PCR_prod_821bp_Vervet_(Simian)_PCR_product_seq_	Towne_promoter_fr_PCR_prod_seg Rhesus_monkey_PCR_prod_821bp Vervet_(Simian)_PCR_product_seq	Towne_promoter_fr_PCR_prod_seq Rhesus_monkey_PCR_prod_821bp Vervet_(Simian)_PCR_product_seq	Towne_promoter_fr_PCR_prod_seq Rhesus_monkey_PCR_prod_821bp Vervet_(Simian)_PCR_product_seq

Figure 10C

481	TTGACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACTTACGCTAACTTACCCACTTGTGCCCATTGCCCATTCGTGCCCATTGCCCATTCTTGACGTCAATGGGATGGCTCATTGCCCATTCATATCCGTTC	600 ATCAAGTGTATCATATGCCAAGTCCGGCCCCCTATTGACGTCAATGACGGTAAATGGCCC	660 GCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCT	ACGTATTAGTCATCGCTATTACCATGGTGATGCGGTTTTTGGCAGTACACCAA
	Towne_promoter_ir_PCR_prod_seq Rhesus_monkey_PCR_prod_821bp Vervet_(Simian)_PCR_product_seq	Towne_promoter_fr_PCR_prod_seq_Rhesus_monkey_PCR_prod_821bp_Vervet_(Simian)_PCR_product_seq_	Towne_promoter_fr_PCR_prod_seq_Rhesus_monkey_PCR_prod_821bp Vervet_(Simian)_PCR_product_seq	Towne_promoter_fr_PCR_prod_seq in Rhesus_monkey_PCR_prod_821bp in Vervet_(Simian)_PCR_product_seq in the seq i

Figure 10D

721TGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTC TGGCAG.TACTCCCATTGACGTCAATGGCGGTAAATGGCCCGCAATGGCTGCCAAGTACA TGGCAGGTACTCCCATTGACGTCAATGGCGGTAAATGGCCCGCGAATGGCTGCCAAGTACA	940CACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAAAATCAACGGGACTTTTCCATGCCC.ATTGACGTCAATGGGG	841 AAATGTCGTAATAACCCCCCCCCTTGACGCAAATGGGCG	960 GTAGGCGTGTACGGTGGAGGTCTATATAAGCAGAGCTCGTTTAGTGAACCGTCAGATCG GTAGGCGTGC.CTATGGGGGGTCTATATAAGCAATGCACGTTTTAGGGAACCGCCATTCTG GTAGGCGTGCCTAATGGGAGGTCTATATAAGCAATGCTCGTTTAGGGAACCGCCATTCTG
Towne_promoter_ir_PCR_prod_seg_Rhesus_monkey_PCR_prod_821bp_Vervet_(Simian)_PCR_product_seg_	Towne promoter fr PCR prod seq Rhesus monkey PCR prod 821bp Vervet (S mian) PCR product seq	Towne_promoter_fr_PCR_prod_seq Rhesus_monkey_PCR_prod_821bp Vervet_(Simian)_PCR_product_seq	Towne_promoter_fr_PCR_prod_seq_Rhesus_monkey_PCR_prod_821bp_Vervet_(Simian)_PCR_product_seq_

Figure 10E

961	Towne_promoter_ir_PCR_prod_seq CCTGGAGACGCCATCCACGCTGTTTTGACCTCCAT ACAMAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAG	Rhesus_monkey_PCR_prod_821bp CCTGGGGACGTCGGAGGAGGACACACAAAAACACGGG.ACCGATCCAG	t_seq CCTGGGGACGTCGGAGGAGCTCCATTCAAAGGTACCGGGGACCGATCCAG	- CATTER AND A CORRESPONDED TO THE STANDARD AND A CORP. A CORP
	Towne_promoter_ir_PCR_prod_seq	Rhesus_monkey_PCR_prod_821bp	Vervet_(Simian)_PCR_product_seg	

1020

	1057	SEQ ID NO:20	SEQ ID NO:22	SEÇ '' NO:23
1021	CCTCCGCGGCCGGGAACGGTGCATTGGAACGCGGATT	CCTCCATAGCCGGGAAGGGTGCATTGGAACGCGGATA	CCTCCATAGCCGGGGACGGTGCATTGGAATGCGGATA	WI COOP
	Towne_promoter_fr_PCR_prod_seq	Rhesus_monkey_PCR_prod_821bp	Vervet_(Simian)_PCR_product_seq	